**AMENDMENTS TO THE CLAIMS**

*Please amend the claims as follows:*

1. (*Previously presented*) An image correction method, comprising:

performing a first conversion in which digital code values of each pixel of image data representing an image to be corrected are converted to values whose relationship with light intensity values or light intensity logarithm values is linear;

performing a second conversion in which at least one of the color or density of said image to be corrected which is represented by said image data is corrected after said image data has undergone said first conversion; and

a third conversion in which the values of each pixel of said image data are restored to said digital code values after said image data has undergone said second conversion,

wherein the image data is corrected without changing the gradation of the image.

2. (*Original*) An image correction method according to claim 1, wherein said image data is obtained by converting values of the light intensity or values related to the light

intensity of each component color of each pixel of said image to be corrected to digital code values A, B, C in accordance with predetermined conversion conditions, and wherein, when A', B', C' are values having a linear relationship with the light intensity values, at least one of said first conversion or said third conversion is performed in accordance with the relational formula

$$A = e\ (a \cdot A') \qquad B = e\ (a \cdot B') \qquad C = e\ (a \cdot C')$$

when the digital code values A, B, C are not greater than a predetermined value f, and in accordance with the relational formula

$$A = e\ (b \cdot A'^{c} - d) \quad B = e\ (b \cdot B'^{c} - d) \quad C = e\ (c \cdot C'^{c} - d)$$

when the digital code values A, B, C are greater than a predetermined value f, when a, b, c, d, e, f are constants.

3. (*Original*) An image correction method according to claim 1, wherein said second conversion is an affine transformation.

4. (*Previously presented*) An image correction device comprising:

first conversion means for performing a first conversion in which digital signal values of each pixel of image data representing an image to be corrected are converted to values whose relationship with light intensity values or light intensity logarithm values is linear;

second conversion means for performing a second conversion in which at least one of the color or density of said image to be corrected which is represented by said image data is corrected after said image data has undergone said first conversion; and

third conversion means for performing a third conversion in which the values of each pixel of said image data are restored to said digital signal values after said image data has undergone said second conversion,

wherein the image correction device corrects the image without changing the gradation of the image.

5. (*Previously presented*) A recording medium on which is recorded a program for executing on a computer a process including:

a first step for carrying out a first conversion in which digital signal values for each pixel of image data representing an image to be corrected are each converted to values whose relationship with the light intensity values or the light intensity logarithm values is linear;

a second step for carrying out a second conversion in which at least one of the colors or density of said image to be corrected which is represented by said image data is corrected; and

a third step for carrying out a third conversion in which the values of each pixel of image data which has undergone said second conversion are restored to said digital signal values,

wherein image data is corrected without changing the gradation of the image.

6. (*Previously presented*) The image correction method according to claim 1, wherein the step of performing the first conversion includes correcting each component color of each

pixel of image data representing an image to be corrected to values whose relationship with light intensity values or light intensity logarithm values is linear.

7. (*Previously presented*) The image correction device of claim 4, wherein the first conversion means converts digital signal values of each component color of each pixel of image data representing an image to be corrected are converted to values whose relationship with light intensity values or light intensity logarithm values is linear.

8. (*Previously presented*) The recording medium of claim 5, wherein the first step includes carrying out the first conversion in which digital signal values for each pixel of image data representing an image to be corrected are each converted to values whose relationship with the light intensity values or the light intensity logarithm values is linear.

9. (*New*) The image correction method according to claim 1, wherein the each pixel data for the image data includes values of (R, G, B) color components, and wherein the step of

performing the first conversion includes converting each component color (R, G, B) of each pixel is converted to corresponding image receptor reflectivity data (r, g, b).

10. (*New*) The image correction method according to claim 9, wherein the reflectivity values (r, g, b) are related to the color component values (R, G, B) by function F(x) such that

$F(x) = e \bullet a \bullet x,$ for $(0.0 \leq x \leq f)$, and

$F(x) = e(b \bullet x^c - d)$ for $(f < x \leq 1.0)$,

wherein x is the reflectivity value (r, g, b) of individual color component (r, g, b) for the pixel, F(x) is the value (R, G, B) of individual color component for the pixel, e is a constant value representing a bit depth of the color component, and a, b, c, d, and f are constants.

11. (*New*) The image correction method according to claim 10, wherein converting each component color (R, G, B) of each pixel to corresponding image receptor reflectivity data (r, g, b) is accomplished by applying an inverse function $F^{-1}$ of the function F(X) to each color component.

12. (*New*) The image correction method according to claim 11, wherein the step of performing the first conversion further includes converting the image receptor reflectivity data (r, g, b) into corresponding tristimulus values (X, Y, Z) by the following matrix calculation

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix} = \begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix}^{-1} \begin{bmatrix} r \\ g \\ b \end{bmatrix}$$

wherein matrix elements $m_{11}$ - $m_{33}$ are constants.

13. (*New*) The image correction method according to claim 12, wherein $m_{11}$ = 3.2410, $m_{12}$ = -1.5374, $m_{13}$ = -0.4986, $m_{21}$ = 0.9692, $m_{22}$ = 1.8760, $m_{23}$ = 0.0416, $m_{31}$ = 0.0556, $m_{32}$ = -0.2040, and $m_{33}$ = 1.0570.

14. (*New*) The image correction method according to claim 12, further including calculating average value [Y] of the Y channel of the tristimulus values (X, Y, Z) prior to performing the second conversion.

15. (*New*) The image correction method according to claim 14, wherein the tristimulus values (X, Y, Z) are old tristimulus

values and the step of performing the second conversion includes converting the old tristimulus values into new tristimulus values (X', Y', Z') by at least one of density correction and offset adjustment.

16. *(New)* The image correction method according to claim 15, wherein density corrections is achieved by applying the following matrix operation

$$\begin{bmatrix} X' \\ Y' \\ Z' \end{bmatrix} = \begin{bmatrix} K_r X \\ K_g Y \\ K_b Z \end{bmatrix}$$

and offset adjustment is achieved by applying the following matrix operation

$$\begin{bmatrix} X' \\ Y' \\ Z' \end{bmatrix} = \begin{bmatrix} K_1 \\ K_2 \\ K_3 \end{bmatrix} + \begin{bmatrix} X \\ Y \\ Z \end{bmatrix}$$

wherein $K_r$, $K_g$, $K_b$, $K_1$, $K_2$, and $K_3$ are conversion coefficients.

17. *(New)* The image correction method according to claim 16, wherein in applying density correction matrix operation, $K_r = 1$, $K_g = 0.18/[Y]$, and $K_b = 1$.

18. (*New*) The image correction method according to claim 16, wherein the step of performing the third conversion includes converting the new tristimulus values (X', Y', Z') to corrected image receptor reflectivity data (r', g', b') by the following matrix calculation

$$\begin{bmatrix} r' \\ g' \\ b' \end{bmatrix} = \begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix} \begin{bmatrix} X' \\ Y' \\ Z' \end{bmatrix}$$

wherein matrix elements $m_{11}$ - $m_{33}$ are constants.

19. (*New*) The image correction method according to claim 18, wherein $m_{11}$ = 3.2410, $m_{12}$ = -1.5374, $m_{13}$ = -0.4986, $m_{21}$ = 0.9692, $m_{22}$ = 1.8760, $m_{23}$ = 0.0416, $m_{31}$ = 0.0556, $m_{32}$ = -0.2040, and $m_{33}$ = 1.0570.

20. (*New*) The image correction method according to claim 18, wherein the step of performing the third conversion includes converting the corrected image receptor reflectivity data (r', g', b') to corrected color component data (R', G', B') by applying F(x') such that

$F(x') = e \bullet a \bullet x'$, for $(0.0 \leq x' \leq f)$, and

$F(x') = e(b \bullet x'^{c} - d)$ for $(f < x' \leq 1.0)$,

wherein x' is the individual corrected reflectivity data value (r', g', b') for the pixel, F(x') is the value (R', G', B') of the corrected color component for the pixel, e is a constant value representing a bit depth of the color component, and a, b, c, d, and f are constants.

21. (*New*) The image correction method according to claim 11, the method further comprising converting luminance pixel data in form of (Y, Cr, Cb) into corresponding color component data (R, G, B) prior to the step of converting the color component data (R, G, B) to corresponding receptor reflectivity data (r, g, b).

22. (*New*) The image correction method according to claim 21, wherein the step of converting the (Y, Cr, Cb) data to (R, G, B) data includes:

determining values for Luma, Chroma 1, and Chroma 2, wherein the relationship is such that $Y = K_Y \bullet Luma$, $Cr = K_{Cr} \bullet Chroma\ 1 + C_{Cr}$, and $Cb = K_{Cb} \bullet Chroma\ 2 + C_{Cb}$, and wherein $K_Y$, $K_{Cr}$, $K_{Cb}$, $C_{Cr}$, and $C_{Cb}$ are constants; and

applying a matrix calculation in the form of

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix}^{-1} \begin{bmatrix} Luma \\ Chroma\ 1 \\ Chroma\ 2 \end{bmatrix}$$

wherein matrix elements $m_{11}$ - $m_{33}$ are constants.

23. (*New*) The image correction method according to claim 22, wherein $m_{11} = 0.299$, $m_{12} = 0.587$, $m_{13} = 0.114$, $m_{21} = -0.299$, $m_{22} = -0.587$, $m_{23} = 0.886$, $m_{31} = 0.701$, $m_{32} = -0.587$, $m_{33} = -0.114$, $K_Y = (255/1.402)$, $K_{Cr} = 111.40$, $K_{Cb} = 135.64$, $C_{Cr} = 156$, and $C_{Cb} = 137$.

24. (*New*) The image correction method according to claim 22, wherein the step of performing the second conversion includes:

calculating average image receptor reflectivity values for [r], [g], and [b] for each color; and

performing affine transformation on individual image receptor reflectivity data (r, g, b) to determine corrected image receptor reflectivity data (r′, g′, b′), wherein the affine transformation is such that

$$\begin{bmatrix} r' \\ g' \\ b' \end{bmatrix} = \frac{K_a[g]}{K_r[r]+K_g[g]+K_b[b]} \begin{bmatrix} 1/[r] & 0 & 0 \\ 0 & 1/[g] & 0 \\ 0 & 0 & 1/[b] \end{bmatrix} \begin{bmatrix} r \\ g \\ b \end{bmatrix}$$

wherein $K_a$, $K_r$, $K_g$, and $K_b$ are constants.

25. (*New*) The image correction method according to claim 24, wherein $K_a = 0.18$, $K_r = 0.3$, $K_g = 0.6$, and $K_b = 0.1$.

26. (*New*) The image correction method according to claim 24, wherein the step of performing the third conversion includes converting the corrected image receptor reflectivity data (r′, g′, b′) to corrected color component data (R′, G′, B′) by applying F(x′) such that

$F(x') = e \bullet a \bullet x'$, for $(0.0 \leq x' \leq f)$, and

$F(x') = e(b \bullet x'^{c} - d)$ for $(f < x' \leq 1.0)$,

wherein x′ is the individual corrected reflectivity data value (r′, g′, b′) for the pixel, F(x′) is the value (R′, G′, B′) of the corrected color component for the pixel, e is a constant value representing a bit depth of the color component, and a, b, c, d, and f are constants.

27. (*New*) The image correction method according to claim 26, the method further comprising converting corrected color component data (R', G', B') to corresponding corrected luminance data (Y', Cr', Cb') for each pixel.

28. (*New*) The image correction method according to claim 27, wherein the step of converting the (R', G', B') data to (Y', Cr', Cb') data includes:

determining values for Luma', Chroma 1', and Chroma 2' by applying a matrix calculation in the form of

$$\begin{bmatrix} Luma \\ Chroma \quad 1 \\ Chroma \quad 2 \end{bmatrix} = \begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix}^{-1} \begin{bmatrix} R' \\ B' \\ G' \end{bmatrix}$$

wherein matrix elements $m_{11}$ - $m_{33}$ are constants; and

determining values for Y', Cr', and Cb' based on Luma', Chroma 1', and Chroma 2', wherein the relationship is such that $Y' = K_Y' \bullet Luma'$, $Cr' = K_{Cr}' \bullet Chroma\ 1' + C_{Cr}'$, and $Cb' = K_{Cb}' \bullet Chroma\ 2' + C_{Cb}$, and wherein $K_Y'$, $K_{Cr}'$, $K_{Cb}'$, $C_{Cr}'$, and $C_{Cb}'$ are constants.

29. (*New*) The image correction method according to claim 28, wherein $m_{11} = 0.299$, $m_{12} = 0.587$, $m_{13} = 0.114$, $m_{21} = -0.299$,

$m_{22} = -0.587$, $m_{23} = 0.886$, $m_{31} = 0.701$, $m_{32} = -0.587$, $m_{33} = -0.114$, $K_Y = (255/1.402)$, $K_{Cr} = 111.40$, $K_{Cb} = 135.64$, $C_{Cr} = 156$, and $C_{Cb} = 137$.

30. (*New*) The image correction method according to claim 10, wherein a set of constants (a, b, c, d, e, f) is one of (4.5, 1.099, 0.45, 0.099, 255, 0.018) and (12.92, 1.055, 1/2.40, 0.055, 255, 0.0034).